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FORMERLY

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WHOLE No. 3230

NEW YORK, SATURDAY, JANUARY 31, 1920

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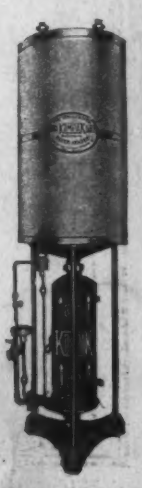

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Gas Engineering Journal

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CXII, No. 5 NEW YORK, JANUARY 31, 1920 Whole No. 3230

Lampblack, By-Product from Oil Gas Manufacture, a Readily Marketed Domestic Fuel*

Filtering Out the Carbon from the Wash Water—Twenty-Five Pounds Recovery to Thousand Cubic Feet of Gas Produced

By E. L. HALL
General Superintendent, Portland Gas & Coke Company, Portland Ore.

Practically all of the artificial gas of California and Oregon is produced by the oil gas process. California crude oil is generally used.

The process is quite simple and consists merely in cracking the oil hydrocarbons into permanent gases by spraying the oil over highly heated checker bricks in apparatus quite similar to the ordinary Lowe water gas superheater.

The average composition of California crude oil as actually delivered to the gas plant is as follows:

Carbon	89.00
Hydrogen	7.00
Sulphur	1.00
Water	3.00
	100.00

The water content is shown since the same actually enters quite appreciably into the chemical reactions—and materially increases the percentages of carbon dioxide and monoxides and correspondingly lowers the amount of free carbon produced, which varies from 20 to 25 lbs. per 1,000 cu. ft. of gas produced, or 2 to 2.5 lbs. per gallon of crude oil used.

Carbon Content of Wash Water

The gases, tarry vapors and free carbon produced in the gas generator, pass through a water seal so designed as to remove only the carbon, while the gases and tarry vapors are scrubbed and cooled in other apparatus.

Fig. 1 illustrates the overflow water from the gas wash box.

The wash water contains somewhat over 1 per cent by weight of carbon.

Fig. 1—Showing the overflow of water from gas wash box

*Editor's Note.—An abstract of a paper presented by Mr. Hall at an American Gas Institute Convention, published in the American Gas Engineering Journal about two years ago revealed so great an interest in the utilization of oil gas carbon as a fuel that all spare copies of this issue and all the Journal could obtain by extensive advertising have been exhausted, yet the orders keep coming in. To supply useful information on this subject, which seems to be in wide demand, Mr. Hall was requested to prepare for this journal the article herewith offered. It covers, we believe, any question that may occur to the worker interested in this subject.

FIG. 2—SHOWING HORIZONTAL CYLINDER PARTIALLY SUBMERGED IN CONCRETE TANKS

When oil gas was first introduced this carbon was recovered by settling out in large wooden vats alternately in use. After partial drainage the carbon was removed by hand labor.

At present the Oliver Continuous Filter is used for this purpose. This apparatus, the invention of E. L. Oliver, of San Francisco, was originally designed for use in handling and washing slimes in the cyanide and other mining processes, and has been adapted for use in many chemical and metallurgical processes. The apparatus illustrated by Fig. 2 consists essentially of a horizontal cylinder, 16 ft. in diameter, open at the ends, built up of wooden staves and partially submerged in concrete tanks, which receive the carbon water. The interior of the cylinder is overlaid with wooden strips dividing the surface into sections which are covered with galvanized iron mesh and several layers of burlap and duck canvas and spirally wound with galvanized iron, with the strands about one inch apart. Iron pipes, acting as spokes, communicate with the individual sections.

The shaft or trunnion is hollow and the pipes are carried therein to one end where there is a rotary valve provided with corresponding number of parts which make a contact alternately with a system under a moderate vacuum of seven or eight inches of mercury and one containing an air pressure of ten or fifteen pounds.

The compressed air is furnished by the usual apparatus, while the vacuum piping is connected through a receiver at the bottom with a centrifugal water pump and at the top with an ordinary vacuum pump, such as is used in steam condenser work. This machinery is shown in Fig. 3.

Operation of Apparatus

The operation of the apparatus is as follows: That portion of the drum which is submerged is in communication with the vacuum ports. The section draws through the canvas large quantities of water, leaving on the exterior of the canvas the suspended lampblack. As the drum emerges from the water, the vacuum connection is continued; but air penetrates through the lampblack and partially dries it. Then a further turning of the wheel breaks the connection with the vacuum ports and makes the connection with the compressed air ports, which happens just before the drum is about to submerge itself again. At this point, the drum is in contact with a sheet iron scraper resting lightly on the surface of the wires. Through the combined action of the air blast and the scrapers the lampblack is removed from the surface of the drum.

FIG. 3—SHOWING VACUUM PIPING CONNECTED WITH CENTRIFUGAL WATER PUMP

There are four units of this type at the Portland Gas & Coke Company's plant, each 16 ft. in diameter and having a capacity of 1,000 gal. of water per minute. The units are motor driven and placed two on each side of a 36-inch belt conveyor onto which the scrapers discharge.

The belt conveyor discharges into four fifty-ton driers by means of plow shaped scrapers resting on the conveyor belt. The driers, shown in Fig. 4, are similar to cement on coal driers and consist simply of steel cylinder 75 in. in diameter by 45 ft. long, which rotate on roller bearings and are chain driven each by a 20 h.p. motor.

The end nearest the belt is provided with a station-

ary head into the upper part of which the wet carbon is discharged and the lower half of which receives the hot gases from the firebrick oven, fired either from wood waste or crude oil.

The opposite stationary ends of the driers are directly connected to 60-in. exhaust fans running at 900 R. P. M. and which exhaust the products of combustion carrying some carbon dust into galvanized iron cyclone air separators where the dust is deposited, as shown in Fig. 5. The driers are set with a slight fall and the dried carbon is discharged by gravity through the funnel shaped lower half of the stationary head into individual bucket elevators which elevate the carbon into an overhead hopper.

Working the Briquet Press

There are two of these hoppers, one serves each set of two driers. They are each installed directly over a 50-mould Fernholtz briquet press, of which there are two. These presses are designed especially for the pressing of oil gas carbon and consist of a bronze mould board, fitted to receive top and bottom plungers actuated by cams and connected by a powerful set of gears to a 15 h.p. motor.

The filling and emptying of the moulds is accomplished by means of a vertical wooden mould board which moves horizontally from front to back and is continually fed with carbon from the overhead hopper. The forward stroke allows the carbon to fill the moulds, the top plungers being up out of the way, while the opening of the mould is just sealed by the lower plungers. The back stroke levels off the material in the mould and the top and bottom plungers are simultaneously pushing together, thus forming the briquet. As the compression is released, the upper plungers are raised clear of the mould board, while the bottom plungers continue in the upward direction, thereby pushing out the newly formed briquet. The forward action of the mould board shoves the briquets off the mould board and the cycle is repeated. Fig. 6 shows the press in action. The press operates at about seven revolutions per minute, producing 50 briquets per revolution, or 350 briquets per minute. Since the briquets weigh about one-half pound each, the press, if operated continuously, would manufacture 126 tons per day.

The briquets as produced roll, or are pushed onto a short rubber belt conveyor, driven from the press which discharges onto a system of circuit conveyors to the storage sheds, as illustrated in Fig. 7. They consist of twelve sectional 12-in. belt conveyors, each equipped with individual motor drive and are connected to lap over each other. The last one in series is known as a stacker, and is used to elevate the briquets to the top of the storage pile and for this purpose is set at a steep angle and can be raised or lowered or moved from side to side as desired without being disconnected.

The process of briquetting is as follows: The wash

Fig. 7—Circuit conveyors and storage sheds

FIG. 4—SHOWING FOUR FIFTY-TON DRIERS

water flows continually from the gas generators, no storage being provided other than that in the Oliver Filter tanks, and the carbon is continuously extracted from the water. The water as discharged back into the Willamette River is as clear as drinking water and is in surprising contrast to its previous appearance. At the present time about 2,000 gal. of water per minute are treated and about 100 tons of carbon recovered per day.

LAMPBLACK CONTINUOUSLY DRIED AND COMPRESSED

The carbon as deposited on the Oliver filter by the suction contains 50 to 60 per cent of water and is dried in the driers to 12 to 15 per cent which experience has shown to produce the hardest briquets. No binder of any kind is used, since the small amount of tarry constituents naturally present in the carbon is sufficient. The lampblack is continuously dried and continuously briquetted. The hopper over the press has only storage capacity for one hour, which is sufficient to admit of ordinary attention to the press.

The briquets produced are cylindrical in form about 2¼ in. in diameter by 2¼ in. long. As the mould board wears, however, these dimensions are somewhat exceeded. The briquets, although quite hard when first produced, nevertheless improve considerably by being allowed to dry out to 5 or 7 per cent. Owing to irregularities of operation, wear on the press, etc., at times considerable dust is produced, therefore, all briquets are very carefully screened, and weighed into 100 lb. sacks just before being delivered.

The composition of the briquets is very similar to that of anthracite coal—the analysis by the Oregon Agricultural College being as follows:

	Per Cent.
Volatile hydrocarbons	8.7
Fixed carbon	87.6
Moisture	3.4
Ash	.3
	100.00
B.t.u. per pound	15,800

Briquets are delivered by trucks and trailers to all parts of the city and since the gas plant is located about seven miles down the Willamette River from the center of the city, the expense for transportation is quite an item.

The briquets sell readily at $13 per ton, and the output is usually sold out for some time in advance.

FIG. 5—GALVANIZED IRON CYCLONE AIR SEPARATOR

Carbon briquets are used for all purposes that domestic coal is used for, but are particularly well adapted for heating furnaces, since they require only to be replenished at long intervals.

10,000-Mile Automobile Run on Benzole Establishes Its Reliability and Suitability as Motor Fuel

An event of great interest to the gas industry is the 10,000-mile run recently completed in England under the auspices of the Automobile Association and the Motor Union, which was reported in a recent issue of the London Gas World. The object of this test was to establish the reliability and general suitability of benzole as a motor fuel, and of ascertaining whether any injurious effect resulted to any part of the engine.

The test was carried out on a 16-hp. Sunbeam car, four cylinders, and was commenced on Aug. 28 and completed on Nov. 5. The itinerary was mapped out so that the inclusion of all classes of country and every grade of road represented the conditions encountered in the normal course of motoring. Every precaution was taken throughout to insure that the car was not tampered with in any way without the knowledge of the observers.

The engine was fitted with a Claudel-Hobson carbureter, and experiments were made during the run with different sizes of jets, varying from 160 to 260. The fuel used throughout was to the specification of the National Benzole Association. The total consumption during the run was 406 gal. 7 pt., equivalent to 24.57 miles per gallon for the complete trial, a figure which shows a decided improvement on the mileage obtained with petrol in cars of the same size.

The car is reported to have run splendidly throughout the test, no trouble whatever being experienced. The same four Lodge plugs were used during the whole time, and only one of these had to be removed for cleaning, about half-way through the run. The engine purred and ran without any sign of knocking. Even under heavy load conditions it was never found necessary to retard the ignition.

On dismantling the engine everything was found to be in perfect condition, and opportunity was taken of inspecting the parts. These showed no sign of wear or undue heating, while the carbonization was very light indeed and was of a fine, soft nature, easily removable without any of the trouble usually associated with the operation of decarbonization.

The success of the trial is yet another vindication of benzole as a motor fuel, and a further proof of its great suitability as an alternative to petrol. It will undoubtedly do much toward stimulating a demand by the motoring public for a reliable grade of rectified benzole at a moderate price, and this will make it more than ever a commercial proposition to install at all gas works of large or moderate size not only benzole recovery scrubbers but refining plants as well. The trouble experienced in the past by the use of benzole of inferior quality, which has had a stultifying effect on this branch of gas-works industry, will thus be obviated.

The writer on motoring topics in a London evening newspaper has commented on this 10,000-mile benzole trial, and, notwithstanding all points in its favor, has concluded his remarks by the statement that under no circumstances would he use benzole on his own car, and this after a personal trial. The reason given for this decision is that while he is fully aware of all the relative merits of benzole as compared with petrol, his experience shows that benzole has a decided corrosive action upon the fuel tank. It is explained that his carbureter was fed by exhaust pressure, and he found that this resulted in the formation of an acid which attacked the metal of the fuel tank at any portion which may have become detinned through damage or any cause. In the writer's view the 10,000-mile test merely shows that, with a new car and a new fuel tank, benzole gave good results. With an old car and a worn fuel tank he considers that benzole would not be so satisfactory. *Ergo*, no benzole for him!

The answer to this criticism is that benzole has been used for years without any trouble of this kind.

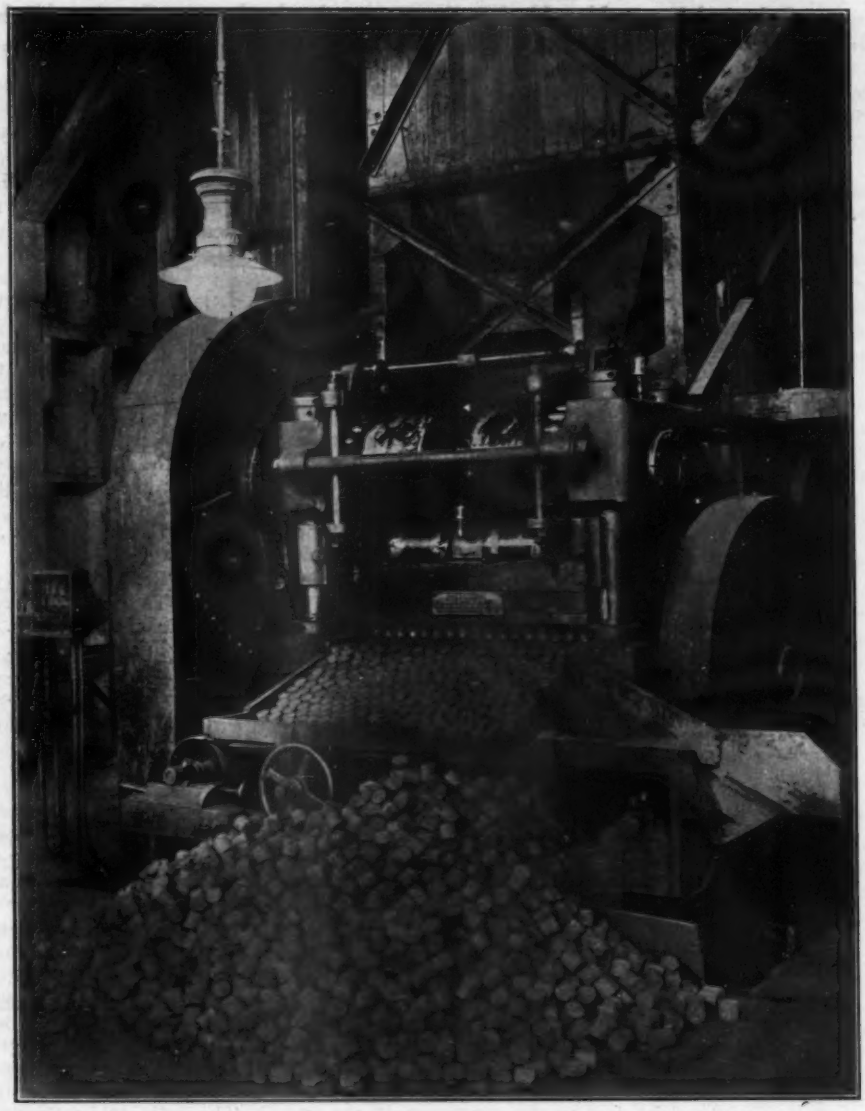

FIG. 6—BRIQUET PRESS

The High Cost of Making Gas

How the Items Entering Into Production and Distribution Have Compelled a Regrouping – Salaried Force Has Had Adjustments in the Lower Grades; Higher Salaried Officers Have Had Little Relief in Meeting Changed Living Costs

By L. W. ALWYN-SCHMIDT

The last five years have seen such a rapid rise in the cost of all the materials, equipment and also of labor required for the purpose of gas making as to call urgently for a restatement of the conditions of the gas industry under the newly created situation.

It is absolutely impossible that the industry should continue producing gas at the present cost without coming very near the danger line of safe operation. In fact, there is plenty of evidence that the industry has already overstepped this line in many instances, and that a great number of gas plants are operating upon an actual loss.

Fortunately, this condition is not beyond repair.

There is a considerable demand for gas all over the United States, and the possibility of adding to the incomes of our gas industry by way of the by-product has given a new lease of life to the industry, the full extent of which can only be estimated at the present time.

If one or the other gas company, therefore, should find itself in trouble it is not at all unlikely that this complaint can be removed by the simple experiment of making a thorough study of its present expenditure and to adjust it properly to the new conditions of manufacturing cost.

Gas, After All, a Commodity

Gas, after all, is a commodity like any other. It has to be manufactured from a raw material, and it is sold like any other material with the help of a rather intricate distribution system.

So it is possible to attack the problem of the high cost of producing gas in approximately the same manner as in the case of all other industrial production. We can find in every instance clearly where the rising cost has undermined the financial position of the respective enterprises and can take steps to improve the situation.

On the basis of pre-war charges the production cost of an average gas plant in the United States was distributed as follows:

By far the largest item was fuel, 24 per cent of which went to make up the cost to the consumer of the national gas plants. Fuel in this case does not mean only the power and fuel used for the production of power. The gas industry takes an exceptional position among the fuel-consuming industries of the nation. It does not consume only fuel for power production, but fuel is the very raw material of the industry itself.

The fuel burned by the gas works is the coal which is employed for the manufacture of gas. In addition to fuel, other materials are required for gas making which add another 10 per cent to the material cost of gas making, bringing the total up to 34 per cent of the present cost of gas as sold to the consumer.

This is by itself not a very high percentage in comparison to many other industries which often have to pay as much as half of their total manufacturing cost for raw materials. The reason is that much of the material requirements of the gas industry are not bought for manufacturing proper, but are needed for the purpose of distribution, and appear, therefore, in the account sheets under maintenance and similar other expense items, which, in consequence, are comparatively high in this case.

Influence of Wages upon Cost of Gas Making

Labor forms the second expense item of importance. It used to be, in normal times, 13 per cent of the total cost of gas. Like the expenditure for material, it is lower than is the case in other industries, while that for officials is slightly higher, with 8 per cent.

Upon the basis of prices of 1914 a unit of gas costing $100, therefore, required the following expenditure:

Labor	$13.00
Officials	8.00
Rent	1.00
Taxes	4.00
Materials	10.00
Fuel	24.00
Overhead	34.00
Profit	6.00
	$100.00

Let us examine now how the war has affected the cost of each of these items.

The first item on the bill is labor. It is that expense item which causes to-day most difficulty, not only owing to its very high cost but also owing to its apparent loss of effectiveness. Labor figures show an increase in cost of more than three-quarters of the pre-war wage. It is not intended here to question the right of labor to obtain such wages as it can, nor to inquire into the problem whether the increase is sufficient to equalize the difference between wages and the cost of living.

The only purpose of quoting these figures is to show conclusively that the same group of men that received $15.65 per working unit is now receiving $29.62.

The individual workingman has not changed; neither has he added to his productive capacity.

In fact, there is evidence that the quantity of production has declined.

It is always difficult to measure the comparative productive capacity of any group of men, especially if the comparison has to be made between to-day and a period five years back.

But gas men have variously stated that they cannot get the same class of men as in former years, and that even the old trained men do not seem to produce as well and are not as effective as they used to be. It is doubtful whether the cause of the trouble is the deterioration of labor or whether inferior materials, run-down equipment or any other reason is at the bottom of this condition.

Leave alone this problem of loss of efficiency and

there remains still the fact that it requires to-day a wage expenditure of $23, approximately, to produce the unit of gas that cost $100 before the war.

Salaries of Officials

The salaries of officials, engineers and clerks have not risen as quickly in comparison as those of the wage-earners. Some companies especially have been disinclined to add materially to the salaries of the directors and the engineering staff, so as to keep down as much as possible the influence of the rising cost of wages upon the cost of manufacturing.

Increases in salaries, nevertheless, have been necessary in certain cases.

The lower paid engineers and the clerks had to receive additions, as they would have found it impossible to carry on their work with their former payments.

These salary increases have been made in most cases right out.

Several companies, however, have found it advantageous to evade the issue proper by giving their employees a larger Christmas bonus than usual, which was to recompense them for their higher expenditure.

Toward the end of the war salary increases have been more frequent. The additional payments are lower in the case of the more highly paid situations and higher in the lesser paid grades.

Rent

Rent increases have affected most gas companies, not so much in the form of higher rent charges but in that of higher taxation for their real property. Most gas plants own the ground upon which they are located. In some cases, however, rent has to be paid for additional accommodation, as office buildings or salesrooms in the business districts of the city. In all these instances higher rents have been charged, and a provincial gas man has pointed out to the writer that most gas companies in his particular district have to meet to-day double the rent charges of five years ago. Also, taxes have gone up at the rate of nearly 100 per cent.

Materials

The material situation has been very unsatisfactory all through the war. Prices for all materials have increased very considerably and the supplies have not been of the usual quality. Also, great losses have occurred to the gas companies by irregular delivery. Most gas plants have paid about double the money for their general material supplies than in former years. No attempt seems to have been made, however, to establish the cash loss caused by the delay in the delivery of the supplies. This loss no doubt is very great. It has resulted in many instances in the partial shutdown of whole sections of the plants and it has in nearly all cases required the use of expensive and not always successful makeshifts which, while they have been very much to the credit of the engineers and chemists, have always added to the cost of production. If one estimates, therefore, the average cost increase of this group of supplies with 100 per cent against the year 1914, this is certainly not overestimated and is borne out by the cost statistics of some of our best gas works.

But the story is only half told by a reference to these general supplies. It comes home more forcefully to the investigator by passing review of the coal situation of the last five years. As said already, coal is the principal of the raw materials required for gas making, and its cost variations, therefore, must have been of an enormous influence upon the cost of gas making. There is no recognized uniform price for coal in this country.

While gas has to be sold anywhere in the circle of the gas plant at a prearranged rate, the price of coal varies not only from month to month but is different also on various points along the line of transportation.

Gas men are figuring with this peculiarity of their business and they have been able to work out a system of purchase that gives them all the coal they require at a fairly uniform rate. This system, however, has come sadly to grief during the war, and there is not a gas plant that has not had serious trouble with its coal purchases. The heavy variations in cost have made impossible any attempt to systematize the purchases.

The average price of a ton of bituminous coal was $2.49 per ton during the year 1914, on the basis of the price recorded in the United States export statistics. In 1915 the price had gone up to $2.53. It saw a slight decrease to $2.43 during 1916 and a renewed rise to $2.94 the following year. Trouble arose in the second half of 1917 and prices became, although fixed by arrangement with the Government, in fact very erratic. Also, the supplies became less regular. To-day the average export price is recorded at $4.62. No doubt it would be wrong to accept these prices as completely representative of the situation. But it is an undeniable fact that coal is bought to-day by most gas plants in the country at a cost at least 75 per cent higher than that which had to be paid five years ago.

Overhead

As pointed out already, overhead expenses are playing a very important part in the operation of a gas plant. They appear in the form of purchase of permanent equipment, repair and maintenance of equipment, interest for capital, payments for rights-of-way, cash locked up in meters, gas stoves, payment for interest on deposits, etc.

The better the business of a gas plant the higher also are, usually, the overhead expenses.

But there is no business enterprise in the world which is less pliable in regard to its overhead than the gas industry. A large main, once laid, will continue to cost independently whether trade along the main is growing or declining. It will pay only in rare cases to take it out of the ground and replace it by a cheaper pipe. So a stock of meters has to be acquired and held in readiness independently from the course of the company's trade. Interest payments on deposits increase with the expansion of business and increase the proportional use of overhead instead of reducing it, as is the case in practically every other form of business.

Distribution expenditure probably has shown the quickest expansion during the war. The cost of the pipe lines, street and house equipment has trebled easily and there has been little to offset the additional cost by an increase in charges.

With a very rigid economy and the application of the most efficient material saving methods, it has nevertheless been possible in most cases to curtail the growth in

the overhead expenditure to a point slightly above 50 per cent of its pre-war cost.

Taking these figures as a basis for the following table of expenditures, it costs to-day to produce a unit of gas, costing $100 before the war, approximately as follows:

Labor	$23.00
Officials	12.00
Rent	2.00
Taxes	8.00
Material	20.00
Fuel	42.00
Overhead	51.00
Profit	9.00
	$167.00

This means, therefore, that a unit of gas that has been sold for $100 five years ago would now have to sell for at least $167, and my readers will admit that the estimate is very conservative in every instance.

The question arises now, How many gas companies have been able to neutralize from year to year the effect of the higher cost of labor material and overhead upon production cost by a similar increase in their taking? The answer decidedly must be, very few.

But the principal problem for the gas industry is not so much that it has lost money over the economic disorganization caused by the war, but how to evade new losses in the future.

Sees the Horizontal Retort Going Into Disuse in British Gas Undertakings

Concedes That the Day of the Last Horizontal Is Long Way Off, but Increasing Tensity of Labor Situation Turns Tide of Favor Towards Continuous Vertical

On the critical point of the most suitable calorific measure of gas there is marked disagreement. Taking as a criterion the largest yield of coal by straight carbonization, the evidence goes to prove that the maximum realizable is represented by a make per ton, from horizontal retorts, of from 11,500 to 12,000 cu. ft. (according to the quality of the material) of gas of about 550 B.t.u. total heat. This amounts to 6,600,000 B.t.u. Compared with the 1890 figure of 10,000 cu. ft. per ton of 16-candle gas, which was of about 600 to 630 B.t.u., this working shows a saving of about 500,000 B.t.u. per ton, due to a more complete extraction. This is the limit.

Therefore it is held by some that the utmost has been done to meet the new requirement. It is further argued that the fuel value of the gas in question is the most suitable and satisfactory for general consumption.

On the other hand, it is contended that a reduced quality of about 500 B.t.u. is better suited to the ordinary run of consumers' appliances, so that in practice this quality is as good as the higher grade supply. In order to produce 500 B.t.u. gas from coal of the same nature, it is necessary to introduce some diluent.

This may be derived from three sources—overpulling on the charge, which means drawing in producer or furnace gases, with some air; taking in a percentage of air after manufacture; or the addition of "blue" water gas made from a portion of the residual coke.

The last named is admitted to be the least objectionable expedient. It is only possible, however, in the case of gas works provided with water gas plant; or as an effect of steaming the coal charge, which is not conveniently manageable with horizontal retorts. Yet it is the sole means of saving coal in gas manufacture by a substantial amount.

The Question of Carbonizing Systems

The consideration mentioned in the preceding paragraph leads directly to the question whether carbonization in horizontal retorts is likely to endure as the common practice. There is something to be said on the affirmative side of the question, which is quite the most salient problem of contemporary gas manufacture. The horizontal retort is not particular as to the character of the coal put into it; which is by no means a trifling consideration as times are, but is, on the contrary, a merit likely to counterbalance a number of shortcomings, if such exist. With a practically full charge, given due time for working off, and sound machinery for charging, pushing and handling the coke afterwards—being, moreover, in possession of the field—it is conceivable that it will be a long day before the last bench of horizontals goes to the scrap-heap. Yet on balance such is in all probability its fate. The claims of the continuous vertical retort are very strong, and have gained ground during the year to an extent that cannot be gainsaid. It has the strongest position in regard to labor, which is a test of great and growing intensity; and it not only lends itself to steaming for increase of production, but calls for it. Moreover, the system appeals as the only means in prospect of effecting the combination of the largest output per retort with the highest yield per ton of coal, which is beyond the powers of the horizontal retort.

From the Journal 60 Years Ago

The Annapolis, Md., gas company celebrates its first birthday. St. John's College lights one hundred burners and the State of Maryland about three hundred more in "The Public Circle"—legislative, executive and judicial halls. The JOURNAL offers this fling, at this early date, to Government operation: "Uncle Sam has a pocket-edition gas works at the Naval School here; but, like all other speculations of Uncle S., the less said about it the better."

Albion, N. Y., company troubled by a neighbor who sues because he objects to the smell of tar.

The frequency with which the JOURNAL alludes to companies "applying net income to extensions" might be enlightening to those whose main anxiety seems to be "squeezing the water out of utilities securities."

Albert Potts, of Philadelphia, pictures a prosperous-looking meter reader and ambitiously advertises "an improved mode of setting gas meters in the walls of buildings."

D. McDonald & Co., of Albany, N. Y., advertise their meters as "being sealed by the State Inspector, according to the laws of New York."

American Gas Engineering Journal

SIXTY-FIRST YEAR

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As the Journal Views It

The Market for Benzol

Not long ago when the gas industry had on its hands Benzol extraction plants, built to supply a war need, an official committee of the industry rather thought it would be a good idea to scrap them. Getting into business as producers of motor fuel didn't appeal to the committee as particularly good business.

Benzol is equal, if not superior, to gasoline as a motor fuel. Tests have demonstrated this. To-day gasoline is retailing to motorists at thirty cents a gallon.

There is likely talk of street cars being driven by gasoline. A traction expert, who incidentally is an oil expert, declares gasoline-driven street railway systems are impossible *because the oil reserves* would be exhausted inside of thirty years.

Motor driven vehicles, in time, will of necessity look to the coal mines as the basis of their supplies. And expert opinion would indicate that this time is very near.

What a scurry and hurry up there will some time be among gas companies to meet an overwhelming demand that at least a generation before they should have plainly foreseen! Such is the penalty of harnessing men's minds to think in grooves.

A Disquieting Trend

Gas companies apparently are very efficient and complacent training grounds for manufacturers' sales engineers.

We hear of this or that gas company employee becoming affiliated with the force of this or that appli-

ance manufacturer. The inducement is higher pay, wider opportunity, and, perhaps more generous appreciation of the efforts expended.

Lately the exodus seems to be among gas companies' industrial fuel specialists.

The leeway in the matter of the industrial fuel man would seem to be such that the gas companies would be invulnerable against the inroads of the appliance manufacturer in this branch.

An industrial man comes to-day. At the end of the year he has put onto the lines a tremendous—as contrasted to the normal gas consumer—load.

Industrial business, if rightly placed, is a continuing business.

We thus face the second year with our industrial man's salary provided for; even though it be a liberal one, by charging off a very slight fraction on each thousand cubic feet of the business already sold. Sales expense on industrial business, no matter how well we pay the seller, cannot ever be much of a figure when we proportion it to the cubic feet sold.

It would seem that in this field the gas company should be able to bid up the appliance manufacturer until he was blue in the face.

Yet they permit him to take their trained men away.

Perhaps it is indifference. We all know that a great part of all the industrial business on gas company lines was put there by men whose wage was paid by the appliance manufacturer. He wasn't interested in selling gas, of course—he was selling appliances—but the result was the same to the gas company in increased load as it would have been had it made the sale itself.

Gas companies apparently are willing that the appliance manufacturer should have his pick of the cream of their industrial gas engineers. So long as they get the load they do not think it matters, it seems, who makes the sale.

This is building on an unsound basis.

The industrial appliance manufacturer is at present more or less linked to the gas companies in that they are practically the sole providers of gas.

But he is not at all linked with the gas company in object.

He aims to sell appliances. The gas company to sell gas.

Many of the appliance manufacturers have chafed in their relationship with the gas companies. Some of them have complained that they hamper rather than assist them in their effort to sell their appliances.

Making gas is not a secret formula that the gas companies have locked up in their bosoms. If it suited one man or a group to put in a gas plant just as they install independent power plants, it is not at all inconceivable that they could find many competent men to handle them.

Industrial business is large-scale business; large enough in some cases to enable even one present-day customer of a gas company to put in and operate a gas plant. Possibly there would be many such to-day were information as to the potentialities in economy and efficiency of fuel gas more generally absorbed.

There is no moral or legal reason why appliance manufacturers should not further such a movement as this to broaden the sale of their appliances.

Hobbling along as they have been hobbling there is reason to believe that some gas companies may never succeed in getting more than a start in the industrial fuel branch.

Primarily, of course, the gas company must be able to sell fuel gas at a rate that will make the individual, the private or isolated plant unjustifiable and impractical.

Secondarily, to reap in full the possibilities of the field, the gas companies must have the best industrial fuel brains there are to be found tied up in their own organizations. People should be educated to turn to the gas company when they seek authoritative counsel on industrial fuel problems.

There cannot be the slightest doubt as to the tremendous volumes of gas that will be consumed in industrial tasks of the future. Looking back over the manner in which gas companies have stumbled into the industrial field and are still stumbling uncertainly about in it we are not quite so sure as we once were that the greater part of it will come from the retorts or sets of city gas plants.

Everything would seem to indicate that the gas industry, as it exists to-day and as it may be broadened out into, may well become the predominate industry of the country. But lack of vision, of intelligence in planning, lethargic thinking, indifference, or plain "cold feet," may make it go backwards instead of forward, until it becomes a petty little proposition supplying merely ranges back in the kitchen, a sickly, flickering flame of light in a few obscure cellars and an occasional auxiliary heater. Of course, we all know this latter will never come to pass, but at the same time we must remember the fellow who "knew" that the tiny smoldering ember from the fireplace could never burn his house down—he could stop the blaze any time it looked serious. He waited a couple of minutes too long and had the dissatisfaction of collecting an insurance that did not by any means cover.

Getting the Mind Off the Job

Despite the warnings as to the competence in a particular task of the Jack of all trades; we are inclined to believe that the gas man who "lives gas, eats gas and dreams gas" will, with very few exceptions, prove a very poor gas man indeed.

One has to have a live interest in his work to amount to much in it. And if one never frees his mind from contemplation of that work it is practically humanly impossible to sustain that interest for a very long period.

The working day in industry has been so reduced that work itself hardly begins until it ends. It has become with some a sort of a disjointed interruption between games of pool, cards, etc.

The industrial day as it is proportioned at present affords the worker a marvelous opportunity of keeping always young, always alive with interest in his work. But something must be done with the free time; some pursuit must be found that will engross the mind for the period to the exclusion of all else.

The man who is an excellent worker, his mind never deviating from his task during the working day, who at its close hastens eagerly away to another engrossment—it may be gardening, landscaping his front yard, wood carving, writing, poultry, experimenting, research work; anything—the man who is always busy and never caught up is the worker whose interest will ever be alive in his work and who will always be young. To such a man it comes as a surprise when he turns back to locate some bygone incident to find that ten years have passed. He does not feel it; cannot sense it. It has seemed but a day. He had never found time to count up the passage of time.

Recreation does not mean idleness. Rather the reverse. It is boredom and dry rot, too much nose to the grindstone, monotony that devours men's vitality—not activity. The man who works hard, eats hard and sleeps long repairs and strengthens the vitality as he burns it up.

There was once an old-fashioned employer who seldom had the opportunity of conversing with a subordinate executive during the working day. The boy travelled faster than the old man could keep up. But they often took dinner together socially and sometimes met in the evenings at an athletic club.

The old man tried to talk of the job, but the boy bubbled over with a small nearby farm he had bought and was building up—a farm that in the best of circumstances could never bring him a tenth of the return that he was already getting from the business he was engaged in.

The old man begrudged this interest, complained to his friends that the boy was going back, was setting up strange gods and losing interest in his real work.

Eventually the boy resigned from his service. The old man never got another like him, but, being an old-fashioned old man, never learned why.

Asked for a reason for Blank's being so much more effective than his successors despite his obsession in the farm, the old man would answer: "Oh, Blank's smart, an unusually smart boy."

But the reason for Blank's being so effective was that Blank on the job was always bursting over with fresh energy. Coming on the job each morning, after an intervening period of absorption in farm, he came upon something new which he seized upon as a relaxation rather than a task. He worked like a whirlwind and could stand it day after day because he had been two-thirds of a day forgetting, part while thinking of farm, part asleep.

Gas companies which further the development of outside interests in employees' minds do well in their own interests. Those who neglect this means of increasing efficiency should adopt the policy forthwith.

Get them interested in things practical and beneficial financially or mentally if possible. But if it's not possible to make them "bugs" on gardening or inventing, at least make them "bugs" on bowling. Getting their minds off the job for a period is the thing. This done they will come back to the job next morning refreshed and interested.

It is not the hours that are gotten out of a man that count, but what he does during those hours.

Method of Extracting Ethylene from Coke Oven Gas on Commercial Scale Developed

Ernest Bury, connected with the Skinningrove Iron & Steel Works of England, who is a noted fuel and chemical research worker, described a new source of liquid fuel, obtainable from coke oven gas, at a meeting of the Cleveland Institution of Engineers held in the city of Middlesbrough, England, on Dec. 15, 1919, and reported in a late issue of the Gas World in London. The AMERICAN GAS ENGINEERING JOURNAL in the news columns of its Jan. 3, 1920, issue published a short report of Mr. Bury's discovery.

Mr. Bury stated in his lecture that at the Skinningrove coke ovens he had succeeded in extracting ethylene alcohol on a commercial scale from coke oven gas. He said that his process, if developed, would render Great Britain largely, if not entirely, independent of outside sources of supply of liquid fuel.

At the Skinningrove works, Mr. Bury explained, 5,800 tons of coal were carbonized every week. An average yield of 1.6 gal. of ethylene alcohol per ton carbonized had resulted from his process. The total weight of coal coked in by-product coke ovens in England in 1918 was 14,635,403 tons, and the application of the process to the whole of this would have yielded 23,416,640 gal. of ethylene alcohol, which, at 2s. per gallon, would have represented a sum of £2,341,664. The recovery of alcohol at the gas works throughout Great Britain would have yielded a further 27,000,000 gal., or, taking alcohol and benzole together, the total quantity of liquid fuel available for extraction through the carbonizing of coal would have been 114,000,000 gal., as against England's present total requirements of 160,000,000 gal. per annum.

Mr. Bury said that the process of extraction by means of sulphuric acid is not a new discovery. He had dis-

covered, though, that the best results were achieved at a temperature of 60 to 80 deg. Cent., and in the process had carried the utilization of heat from the coke oven plant to the utmost limit. He had obtained ether, chloroform, iodoform, acetic acid and acetone, among other derivatives, from coke oven gas after the benzole had been extracted.

Dr. J. E. Stead, F.R.S., a noted English analytical chemist of Middlesbrough, England, was interviewed by the London *Times* and stated for publication in that paper that Mr. Bury's results were undoubtedly an epoch-making record. Dr. Stead complimented not only Mr. Bury but also the general manager (A. Hutchinson) and the directors of the Skinningrove Iron Company, Ltd., on the encouragement they had given to such a complicated research as this. Although the chemical reactions involved were well known, the very fundamental fact that the best temperatures for absorbing the ethylene from coal gas lie between 60 and 80 deg. Cent. was a discovery. The marvelous result was arrived at only after repeated failures. It was important to note that the conclusions of German authorities published in textbooks were found to be entirely wrong. In many cases in the past when fundamental discoveries had been made in England it was the Germans who had followed them up and made them a success, but now, so far as the Skinningrove company was concerned, not only had an important discovery been made but they had constructed a plant to recover the alcohol, and this had been done by utilizing almost every unit of heat from the waste products of the coke ovens.

What Becomes of the Earnings of Capital?

That the earnings of capital are given to the benefit of labor in the final analysis is the contention of the Hon. George E. Roberts, vice-president of the National City Bank, New York, in a part of an address made by him and quoted by The Bankers' Magazine. Mr. Roberts said:

"We are hearing a great deal now to the effect that a new era has begun, in which the common people will fare better; that labor is about to have a larger share of the joint product of labor and capital than in the past. There is a vast amount of misunderstanding about the division between capital and labor. The truth is that the greater part of all that capital seems to get really inures to the benefit of labor, for all additions to capital seek investment in production and labor is the chief beneficiary of increased production. Wages depend on production, and production is increased by placing more and better machine equipment in the hands of labor.

"There is a definite relationship between the amount of new capital available for investment, and the demand and compensation for labor. They go along together. The great principle of social progress lies in the fact that in all advanced countries capital increases faster than population and that there is no way in which capital can be put into use except by employing labor. Every dollar of new capital accumulated means a new demand for labor, and with capital increasing faster than population labor comes into a constantly stronger position.

"Capital and labor must be used together, and when two things must be used together, and one is scarcer than the other, that one has an advantage. I remember that there used to be some such relationship out here between corn on one side and cattle and hogs on the other. If we had a big crop of corn and feeders were scarce, corn would be very cheap and feeders would bring a good price; but if we had a short crop of corn and the country was full of feeders then the corn grower had the whip hand. So it is with capital and labor, except that the supply of capital is always increasing faster than the supply of labor. We saw the effects illustrated during the war; money or credit was relatively abundant; the Federal Reserve banking system could create credit, but it could not be used without labor, and employers all over the country were bidding against each other, and ran wages up to nearly double the normal rate.

"And do you realize that practically all the uses to which labor and capital are applied are for the common welfare? The vast expenditure for construction and equipment are for the purpose of serving in some manner the masses of the people, of supplying something they want and can afford to buy. There is no other employment for capital. It would not take many factories or railways to supply the wants of the rich; there are not enough of them; it is the wants of the millions that keep the wheels of business turning. And with capital increasing faster than population, and with the enormous increase in investment and equipment that is going on, with the improvement in methods and machinery, we have normally a constant increase of production per head of population, and the only way these commodities can be distributed is by such a continual readjustment of wages and prices as will enable the masses of the people to buy them.

"Suppose you knew that in the years to come the production of wheat would increase faster than population; that it would rise from say five bushels per capita in 1918 to six bushels per capita in 1919, seven bushels per capita in 1920, eight bushels per capita in 1921, and so on indefinitely? Do you think that any possible combination could prevent the benefits of such abundance from reaching the masses of people? And something like that is going on all over the field of production in which capital is the chief factor. And with this the case, with capital increasing faster than population, you can no more prevent the benefits of progress from reaching the people than you can prevent the rivers from reaching the sea."

PUBLICATIONS

Application of the Interferometer to Gas Analysis

Author, Junius David Edwards, associate chemist of the U. S. Bureau of Standards. Paper Binding; 10 by 7; 19 pages.

This is No. 131 of the Bureau of tandards' Technologic Papers. It describes the principle and method of the interferometer and also the calibration. The effect upon the observation of variations in gas composition and method of operation are pointed out and equations developed for calculating the same. Typical cases in which the interferometer may be used are analyzed in order to determine its suitability.

This paper is now ready for distribution and those interested may obtain a copy by addressing a request to the Bureau of Standards, Washington, D. C.

Peterson Explains the Need of Competition in Selling

In Combination Gas and Electric Companies, Take Away the Element of *Competition* and Salesmen Cease to *Sell* and Become Order Takers

By S. G. ADDISON

Peterson had just been summoned to the office of the Old Man. "Peterson," said he, "this is Mr. Camberly, president of the Camberville Gas & Electric Company. He has heard that we have been very successful in our selling efforts and he called on me to-day to learn more about our methods. I have told him that all the selling is in your hands and that you will probably be able to give him all the information he desires. I shall be glad to have you give him all the information that you can. There is no reason why we should conceal anything from him."

Mr. Camberly accompanied Peterson back to his office and, comfortably seated and smoking one of the cigars that Peterson kept for special visitors, remarked: "Mr. Peterson, I am not at all satisfied with the returns that we are getting from our sales efforts. I have had the past records tabulated and find that we are not doing as well now, in either the gas or the electric end, as each was doing before we combined. We are spending just as much money as we did before, and there are a number of the present sales force who worked for either the gas or the electric company before we combined, but they don't seem to be showing the results. You are getting the sort of results in gas that I want to get, and I am desirous of finding out how you do it. I am also going to visit some electric companies."

"Have you any combination companies on your list?" asked Peterson.

"No, I don't think that I have. I had not looked at it in that way before, but I haven't been able to find any combination company that is making a record that will be worth my while to investigate. To tell you the truth, I am not only looking for methods but for a really big man to carry out those methods."

"If you will pardon me for taking the liberty of doing so," Peterson said, "I will tell you what I think is the real trouble with your new business efforts."

"Go ahead," returned Mr. Camberly; "I am really after information. The property is not paying as well as it should. In fact, the gas end is barely holding its own and I have got to do something to make it show better results."

"If I am not mistaken, you have one department which looks after the commercial work for both the gas and electricity. Am I right?"

"You are."

"I think that is one source of your trouble. I was more strongly convinced than ever that lack of competition is the source of decreasing returns from sales effort after I read an article in a recent business paper. This man showed how the custom of waiting upon purchasers had a tendency to make retail store clerks very poor salesmen on the road. They had become so accustomed to allowing the customer to select what he or she wanted that they had never developed, or had lost the art of selling. As a result they were not able to sell the dealer as large orders as would a man who had never had any retail store experience.

"Now, I believe that the same rule applies to the gas and the electric business. When a man is working for a gas company he must sell gas. He hasn't anything else to sell. The electric salesman is offering him keen competition and he must go out and actually sell in order to make a showing that will enable him to hold his job. He develops into a real salesman whether he was one in the beginning or not.

"When the two companies combine, however, and there is no competition, there is not the same incentive to endeavor to sell. The salesman has all there is in his line. He, like the grocer, carries a full line and allows the customer to take his choice. There not being any competition, there is no very accurate method of measuring the salesman's effort and sooner or later he ceases to sell and becomes a mere order taker. He gives people what they want rather than *sell* them what he has. You know, a specialty salesman is usually better able to get results than a general salesman. The general salesman carries so many items that he is not able to give each item the attention that it deserves, and in the very nature of the case he has to do a considerable amount of order taking.

"This fact is realized by some manufacturers to such an extent that they have distinct and separate selling organizations for different lines. Each salesman carries but one or two lines, and the different salesmen may cover the same territory. They

have found that this duplication pays, because the variation in the uses of their different products is so great that no one man could do justice to all the products.

"I think that one reason, and perhaps the greatest reason, why your sales department is not getting better results is because all competition has been removed and they have sort of given up trying. The lack of competition seems to affect most sales departments very much as a tropical climate affects human beings. They become more and more indolent, until it becomes almost impossible for them to do a good day's work. You know, the Romans were making good progress so long as they had to fight the surrounding nations. When they had captured the greater part of their world and there was no keen competition left they began to become lazy and degenerate, and soon lost their leading place in the world. I have never yet learned of any great accomplishments which could not be traced to some incentive resulting from a state of competition."

"Then, you think it is a mistake to have the same department handle both gas and electricity?" interrupted Mr. Camberly. "I had never looked at the proposition before just as you have explained it, but there seems to be some sense in what you say."

"I will go farther than that," replied Peterson. "I think that it is a mistake to combine gas and electric companies at all. It may be very satisfactory to own both, but I can't believe that it is good policy to operate them as a single unit. They are natural competitors, and the only way in which they can develop to the greatest extent is to have them remain distinct units. I know of one company that operates straight electric companies, straight gas companies and combination companies. I don't know just how well they are doing, but the latest facts I have had in regard to their business are that the straight gas companies and the straight electric companies are making a far better showing than the combination companies. I know another group of men who own both gas and electric companies in the same cities but who retain the corporate independence of each company. They are making a far greater success. I am sure, than would be the case if they were operating these companies as combination companies."

"I can't agree with you on that point," said Mr. Camberly. "We are making a very material saving in overhead and operating expenses by combining."

"I know you are," agreed Peterson; "but I still believe that you are losing more in public good-will and the incentive to your employees that keen competition gives than you are gaining in economies."

"That may be, but I fail to see it," interposed Mr. Camberly. "Anyhow, we are wandering away from our point. You were going to suggest some way of reorganizing our new-business department, I believe."

"That was what I was coming to," continued Peterson. "What I want to make clear is the fact, for I consider it a fact, that you can never secure the same results from the sales force of a combination company that you could from the same men if part of them were employed by a gas company and the remainder by an electric company, and the two companies were competing with each other for the same business.

"You know, there is an old saying that competition is the life of trade, and I am convinced that it applies to the gas and the electric business to a greater extent than it does to any other line of endeavor."

"You seem to be making excuses for my sales department and putting the blame for the falling off in results up to me," remarked Mr. Camberly. "Remember that I wanted suggestion and not criticism."

"I am not trying to criticise you," explained Peterson; "what I am trying to show you is a principle of business which I fear has been too often overlooked in the recent past. There is no such thing as monopoly. There is just so much money in this world to be spent, and if you don't get your share of it someone else will. You can't monopolize the spending of money. In an effort to make your profits greater you may decrease your volume of sales.

"In the case of your company, until you can introduce some method of competition in your sales department I don't believe that you are ever going to get the results you desire. You will probably have to separate your selling force into a gas department and an electric department, and let these two departments compete with each other. However, you will have to be the judge of that. I will show you just how we get the results we are getting here, and then you can make your own decisions. First, I want to show you one of the installations we have just put into one of the leading hotels in this city. If you will go over there with me we will have something to eat and I will show you the installation."

Problems to Be Discussed at Illinois Gas Association Meeting Expected to Stimulate Large Attendance

A suppositious gas plant of great capacity, located in a coal-mining region where unfailing supplies of cheap fuel are available, transmitting its product long distances, is the subject of a paper which has been added to the tentative list of papers made up by the Illinois Gas Association to be read at its annual meeting in Chicago next March. In view of the fact that a vast experience has been accumulated in the artificial and natural gas industries on all the phases of the problems involved, it is considered that the subject can be handled exhaustively. The paper will be the work of several men, one covering the physical features of the generating plant, another its operation, a third pipe lines and their operation, and another writer analyzing the financial phases. Arrangements will be completed securing a thorough discussion of the paper, which, it is conceded, is made a timely one by the great coal miners' strike of 1919.

Another new paper, of which the author is to be Alfred Herz, of the Public Service Company, will examine the relative efficiency of gas and electricity as fuel agents in heat treating. In another paper, to be written by Rufus C. Dawes, of Chicago, the effect of the increased functions of gas on the credit and securities of gas companies will be discussed.

The directors of the association are sanguine that the importance of the subjects to be treated in these and the other papers selected and the discussion of them which general interest they believe will stimulate will have the effect of securing a very large attendance at the meeting.

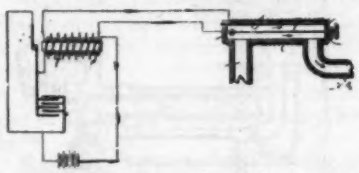
Gas appliance people are likewise of the belief that many will be present. The number of applications for space in the manufacturers' exhibit to be held already mount to a considerable figure. It has been found necessay to reserve an entire floor for the show.

PATENTS PERTINENT TO GAS INDUSTRY

Process and Apparatus for Precipitating Matter from Gases

Patent No. 1,325,124; described in Patent Office *Gazette*, Dec. 16, 1919, page 466. Wm. Walker Strong, Mechanicsburg, Pa. Filed Oct. 23, 1918. Serial No. 259,303. 8 Claims. (Cl. 183—114.)

This apparatus for precipitating

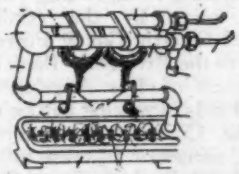


matter from gases comprises an active electrode, which comes in contact with the gas and has a relatively great surface curvature. There is a passive electrode that is out of contact with the gas and has a comparatively small surface curvature.

Gas Generating and Heating Apparatus

Patent No. 1,325,062; described in Patent Office *Gazette*, Dec. 16, 1919, page 453. James William Walker, Jr., Winston-Salem, N. C. Filed March 6, 1918, Serial No. 220,839. Renewed Nov. 6, 1019. Serial No. 336,154. 2 Claims. (Cl. 158—56.)

This apparatus for producing and burning gas has a pair of horizontal

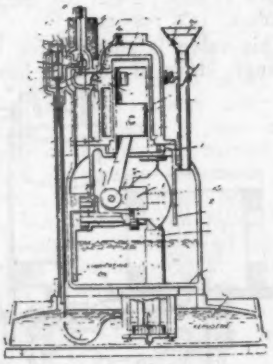


tubular heating chambers arranged sire by side in parallel relation. A hydrocarbon supply tank is connected directly to one end of one of the chambers. A water supply tank is connected directly to the corresponding end of the other chamber, and there is a mixing chamber into which both chambers directly open at the other end. A single perforated horizontal burner tube is located below and substantially midway between the heating chambers. A vertical pipe leads from the mixing chamber to the adjacent end of the burner tube. There is a tray disposed beneath the burner tube which is connected to the tube to support the chambers and tube. This tray is adapted to contain an inflammable substance for initially heating the burner tube and heating chambers when ignited, so as to vaporize the hydrocarbon and water.

Internal Combustion Engine

Patent No. 1,324,824; described in Patent Office *Gazette*, Dec. 16, 1919, page 409. Roy W. Ide, Springfield, Ill., assignor to Ide Patents Corporation, Springfield, Ill., a corporation of Illinois. Filed Feb. 19, 1917. Serial No. 149,572. 2 Claims. (Cl. 123—132.)

The casing of this internal combustion engine has separated lubri-

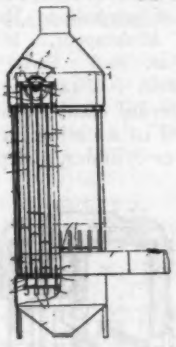


cant and liquid fuel containing chambers. The liquid fuel chamber is below the lubricant fuel chamber. A pump effects the flow of the liquid fuel to the carbureter. An engine operated pump operates the shaft that extends into the fuel containing chamber. A sleeve maintains separation between this chamber and passes upwardly into the lubricant containing chamber. It is through this sleeve the shaft passes.

An Apparatus for Electrical Treatment of Gas

Patent No. 1,325,136; described in Patent Office *Gazette*, Dec. 16, 1919, page 467. Linn Bradley, East Orange, N. J., assignor to Research Corporation, New York, N. Y., a corporation of New York. Filed Feb. 18, 1916. Serial No. 79,086. 11 Claims. (Cl. 183—7.)

This is a multi-flue apparatus for

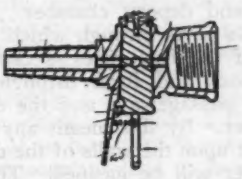


the electrical treatment of gases. There is a plurality of flues of polygonal cross-section which have walls that form an electrode, and a discharge electrode means extends longitudinally in the flue.

Safety Gas-Cock

Patent No. 1,324,817; described in Patent Office *Gazette*, Dec. 16, 1919, page 408. George H. Harris, Utica, N. Y., assignor to Utica Valve & Fixture Company, Utica, N. Y. Filed Sept. 21, 1915. Serial No. 51,865. 1 Claim. (Cl. 251—91.)

In this safety gas cock there is a casing which has a channel and a key, has a finger-piece for closing



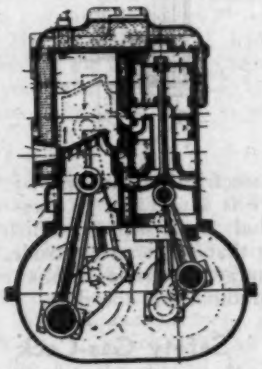
the channel, a plurality of recesses located in the lower edge of the cas ing. There is a lever with a tooth

adapted to engage any one of the recesses, which locks the key in different positions. Integral portions project from the casing and automatically stop the turning of the key in either open or closed position. A coiled spring, disposed between the lever and the finger-piece of the key, holds the lever yieldingly within the recesses. A headed screw holds the key in position. There is a washer having an aperture with straight sides, and the key, having a lug adapted to fit in this aperture in the washer, allows the washer to turn with the key to relieve the screw from any friction.

Gas Engine

Patent No. 1,325,295; described in Patent Office *Gazette*, Dec. 16, 1919, page 497. James Jessen, Minneapolis, Minn., assignor of one-half to James A. McNulty, Minneapolis, Minn. Filed March 21, 1916. Serial No. 85,572. 24 Claims. (Cl. 123—59.)

An internal combustion engine is comprised of a casing having therein a power cylinder, a deposit cham-

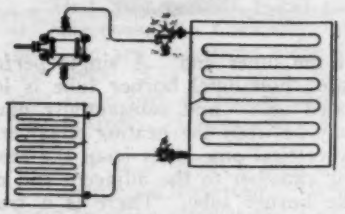


ber. Also there is a multiplicity of passages, some of which enter and leave the deposit chamber so that any particles of liquid carried through these passageways will be thrown and will gravitate to the walls of the deposit chamber. There is a means for causing explosive mixture to flow through the passageways and deposit chamber. There are also ports through which a portion of the fuel gases is caused to flow back and forth through some of the passageways and the deposit chamber. By this means any liquid deposit upon the walls of the deposit chamber will be gasified. There is a port through which a portion of the fuel gases is introduced into the power cylinder.

Refrigerating Apparatus

Patent No. 1,325,128; described in Patent Office *Gazette*, Dec. 16, 1919, page 466. Gustave A. Wegner, Rochester, N. Y., assignor of one-half to Wegner Machine Company, Buffalo, N. Y., a corporation. Filed May 13, 1918. Serial No. 234,271. 5 Claims. (Cl. 62—6.)

This refrigerating apparaus is a

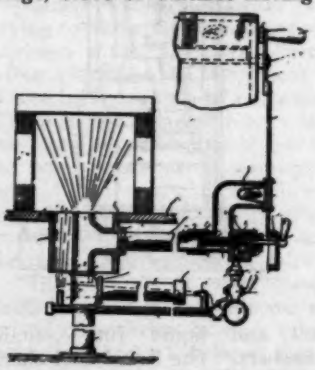


type employing a volatile liquid refrigerant expanding in a cooling element. It is distinguished by a means at the inlet of the cooling element for maintaining a predetermined pressure of the supply of liquid refrigerant to the cooling element. A valve controls the vaporous discharge from this element, which in turn is controlled by the temperature of the discharge vapor. This prevents the passage of saturated gas.

Valve for Gas Burners of Furnaces, Stoves and Ranges

Patent No. 1,325,457; described in Patent Office *Gazette*, Dec. 16, 1919, page 526. Eugene W. Vest, St. Louis, Mo. Filed April 8, 1918. Serial No. 227,246. 2 Claims. (Cl. 158—119.)

This valve is adapted for use in a range, stove or furnace having a

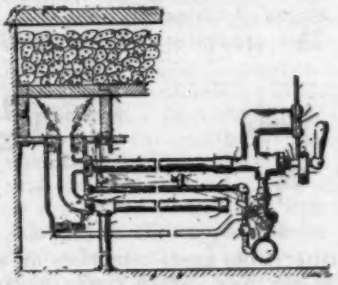


bunsen burner in its fire chamber. The combination consists of a top for the fire chamber, the gas-valve stem of the burner and an air-throat for the burner. There is a means for controlling the entrance of air to the throat, and there is a cam on the gas-valve stem. Also, there is a means at the top of the fire chamber for directing the hot gases toward the top and regulating their passage thereat. There is a suitable means for simultaneously moving the gas-valve stem and the air-controlling means for the entrance of air to the air-throat, as well as a means at the top of the fire chamber.

Gas Burner for Furnaces, Stoves and Ranges

Patent No. 1,325,456; described in Patent Office *Gazette*, Dec. 16, 1919, page 525. Eugene W. Vest, St. Louis, Mo. Filed April 8, 1918. Serial No. 227,244. 3 Claims. (Cl. 158—99.)

This is a fire box divided into a plurality of small combustion cham-

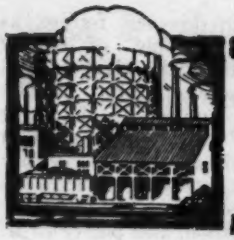


bers by horizontal base sections. There are top sections, vertical partitions and side sections. These sections are united to like sections by overlapping joints. The base sections have an aperture through which the gas and air enter. All of the sections are made of highly refractory material except the base sections.

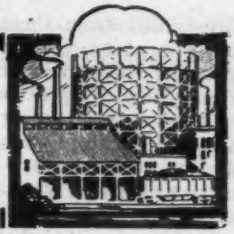
Bids Invited for Sale of United Electric Gas & Power

Formal notice has been given that on March 5, 1920, at 3 o'clock p. m., pursuant to the provisions of Article 13 of the first consolidated 5 per cent sinking fund, twenty-year mortgage, given by the (California) United Electric Gas & Power Company to the Broadway Bank & Trust Company of Los Angeles, trustee, sealed bids in writing will be received by the Citizens Trust & Savings Bank, successor in trust to the said Broadway Bank & Trust Company, for the sale of bonds issued under said mortgage; said bonds to be purchased by the Citizens Trust & Savings Bank for and on account of the sinking fund.

The amount in the possession of the trustee available for the purchase of said bonds is the sum of $15,331.72.



NEWS OF THE GAS INDUSTRY



Resolutions Adopted at Conference on Natural Gas

The following resolutions were adopted at the Natural Gas Conference in Washington, on Jan. 16, called by Secretary Lane:

Whereas, The supply of natural gas is limited in quantity and is not being replaced by nature, and

Whereas, There is no other fuel that can replace natural gas which is as cheap, as convenient and as efficient, and

Whereas, The supply of natural gas is failing in many communities; be it

Resolved, In order that the supply of natural gas may be prolonged, and the service improved, this conference recommends that the appropriate agency in each State which uses natural gas take measures to discover what amount of natural gas is now being wasted by the consumer, various causes of such waste, and adopt such measures as may be available to reduce such waste and effect economies in order that the benefits from this natural resource be prolonged; and be it further

Resolved, That the appropriate agencies, both State and Federal, be urged to stimulate research in perfecting means and methods for more efficient use of natural gas; and be it further

Resolved, That the appropriate State and Federal agencies be urged to conduct educational campaigns to instruct consumers and the public in the importance of the waste of natural gas; how economies in the use of natural gas may be effected and on the natural gas situation in general, that the public may be informed on the subject, and deal with it in the most intelligent manner; and be it further

Resolved, That every effort be made towards arriving at understandings between the natural gas industry and the communities using natural gas as to how the supply of natural gas can best be conserved and its life prolonged; and be it further

Resolved, That a committee of ten be appointed by the chairman of this conference to represent the natural gas industry, and the public and Federal institutions to co-operate with the Director of the Bureau of Mines in working out a constructive program for the conservation of natural gas and the bettering of the natural gas service, and in collecting and distributing information on this subject.

Benzol Quoted High

Cresylic Acid Supply Short—Crude Quoted at One Dollar

The prices on benzol are very high, standing at 36 cents per gallon on some recent sales. There is very little available in the market and the demand is heavy. It is reported in trade circles that should benzol be offered in any volume, strong buying competition might drive prices even higher.

Toluol is in better supply than benzol, due to the fact that at the outset of the coal strike fair supplies of toluol were held in store. The demand for toluol is of fair proportions and prices are well maintained. There is also some stringency felt in the market for toluol. Statements are made that shipments can be made with little delay, but there is not much business taken on the basis of prompt delivery. Quotations for car-lots stand at 28 cents per gallon, but recent spot transactions in drums were put through at somewhat higher levels.

The supply of cresylic acid is very short and there is none in the market for spot delivery. The price on the 95 per cent dark has advanced from 72 cents to 85 cents per gallon in drums and from 75 cents to 90 cents in barrels. The price of the crude has advanced from 77 cents, quoted a few weeks ago, to 95 cents per gallon in drums. In barrels the price of the crude has advanced from 80 cents per gallon to $1. Orders are not taken for more than ten barrels.

The quotations on other by-products are as follows: Coal tar, $8 per barrel; naphtha, 32 cents per gallon; xyhol, commercial, 35 cents per gallon; xyhol, pure, 40 cents per gallon; naphtha, solvent, 23 to 27 cents per gallon; naphtha, heavy, 24 cents per gallon in drums.

Nolan Bill Passed by House of Representatives

The House of Representatives has passed the Nolan bill to give effect to certain provisions of the convention for the protection of trade-marks and commercial names, made at Buenos Aires, Argentina, Aug. 20, 1910. The bill gives authority to the United States Commissioner of Patents to deal with the international bureau established at Havana, pursuant to the convention.

Representative Nolan explained the provisions and purposes of the bill, which was supported briefly by Representatives Davis of Tennessee, Merritt of Connecticut and one or two other members. Representative Mann of Illinois, formerly Republican floor leader; Bee of Texas, and other members asked questions, which were answered satisfactorily. The Buenos Aires convention was laid before the House for its information. It was brought out that former Secretary of the Treasury Glass recommended the Nolan bill.

South American Plans of Emerald Oil Co. Under Way

The plans of the Emerald Oil Company, with headquarters in Winfield, Kansas, for the development of an immense tract of acreage in Colombia, South America, are developing rapidly. The first geological party, which will make a thorough study of such parts of the nearly two million acres of land as lend themselves to geological investigation, arrived in Colombia about the first of the year. Chester W. Washburne, a consulting geologist of New York

City, sailed from there Jan. 13 to join this party. B. Ross Jones, as operating superintendent, will sail from Tampico, Mexico, where he has been superintending the drilling of a well for the Emerald Oil Company, to study matters of operation on the Colombian tract and to determine the location for the initial test well. It is expected that the preliminary investigations of the geologists and operating superintendent will take about three months.

The drilling operations of the Emerald Company are being increased in this country materially since the first of the year. A second location has been made upon the Carroll lease in Section 33-13-10, Red River Parish, La. This is in the Bull Bayou district where large producers have recently been brought in. Carroll No. 1 is through the regular gas sand. This well is in the trend of the big production in this district.

Two new locations have been made on the Teeter lease in Section 21-23-5, Greenwood County, Kansas, where Teeter No. 1 came in recently as a good producer. Teeter No. 1 is a good flowing well and it is estimated as better than a 100-barrel pumper.

The Mexican well of the Emerald Oil Company, in the Tamboyoche Field on the Panuco River about 15 miles west of Tampico, has begun drilling.

Gas Efficiency Committee Is Named for California

As a result of a conference following an order issued by the California Railroad Commission authorizing a thorough investigation on the subject of gas quality in California there has been formed a "joint committee on efficiency and economy of gas." This committee, which is made up of gas experts representing the commission and the gas companies, will carry out a program of activities in connection with an intensive study of California's gas problems as outlined by five sub-committees appointed to direct the work.

Tentative arrangements have been made for joint tests to be made at Santa Barbara and San Jose. Further steps in the study will be outlined at the next meeting of the committee, which will be held in the office of the Railroad Commission in Los Angeles.

The Pacific Gas & Electric Company, Los Angeles Gas & Electric Company, Southern California Gas Company, Southern Counties Gas Company, San Diego Consolidated Gas & Electric Company and the Western States Gas & Electric Company were represented at the initial conference with representatives of the Railroad Commission. They effected a permanent organization of a joint committee, of which L. S. Ready, head of the gas and electric department of the Railroad Commission, was made chairman, G. S. Jacobs treasurer and E. S. Bryant secretary.

Welsbach Company Conducting Semi-Indirect Lighting Campaign

Campaign Manager Found 80 Per Cent of Houses with Dilapidated Chandeliers

The Welsbach Company of New England is conducting a demonstration campaign of the new semi-indirect home Welsbach light throughout New England. The campaign at present is being held in Fall River, Mass., through the Fall River Gas Works Company. The cities in New England with the semi-indirect lighting chandeliers and in which campaigns have ended are Boston, Hyde Park, Concord, Portland, Beverly, Salem, Brockton, Lowell, Haverhill, Providence, East Boston, Malden and Worcester.

The campaign throughout has been meeting with unusual success. In the city of Fall River, up to the present time, over 500 lights and the new fixtures have been installed and accepted in homes throughout the city and there are 300 more out on trial.

L. B. Michaels, sales campaign manager, has arranged the campaign in such a way as to make it afford an opportunity to secure semi-indirect gas lighting on reasonable payments.

There are twenty men employed from all parts of the country, the best that can be secured in this line. No expense has been spared to secure the services of the best informed men in gas-lighting demonstration.

The campaign is being conducted on the following sales arguments:

"There are no chimneys or cylinders to keep clean nor to break from damaged mantles. A chimney or draft inducing cylinder is ordinarily intended to increase the candlepower by accelerating the draft surrounding the mantles. There are no snapping, cracking cylinders to bother with in this new fixture, as the 'Kinetic principle' of burner construction takes the place of cylinders in increasing the candlepower. The source of the light (mantles) is entirely hidden from view. The illumination is neither entirely direct nor entirely indirect. It is semi-indirect, soft, diffused, resful illumination, and plenty of it.

"The burner head is cast metal; all parts exposed to heat are practically indestructible. The fixture is a semi-indirect illuminative and decorative fixture, as against a glowing light and an old worn-out chandelier. It will last a lifetime or more, and the ordinary wear and tear on mechanism will have little effect on its durability. Any parts broken by accident can be readily replaced. Semi-indirect lighting will gain in popularity in years to come, rendering durability in the fixture especially desirable."

In speaking of the campaign Mr. Michaels said: "The campaign is operated through the gas companies by the Welsbach Company of New England. Light is considered the fourth commodity, being superseded only by food, raiment and shelter heat. Up to the present time we have found 80 per cent of the homes in cities equipped with dilapidated chandeliers and oftentimes in rooms where there is $1,000 worth of furniture. This condition prevails throughout the United States.

"We solicit demonstrations only at first, leaving the fixture in the home for three days' use. In that way the entire family has an opportunity to observe the result without being annoyed by a salesman while the subject is being discussed. At the end of the three days, if purchased, the fixture is paid for on easy terms. The total is $23, or, if paid for within thirty days, $21. If not purchased the fixture is removed as quietly and as courteously as installed. We have a stock of 1,000 fixtures in each city, which, when sold, will complete the campaign in a city.

"The advantage of the demonstration campaign lies in the fact that a tenant as well as a landlord can become the owner of a new chandelier, instead of attempting to dress up an unsightly old fixture with new small lights. Heretofore, lighting fixtures have been considered part of the house, such as the furnace or the bath. This demonstration campaign will rapidly spread throughout the country."

Methods of Conserving Natural Gas Supply in Field Operations

At the Natural Gas Conference in Washington, D. C., on January 16, Dr. Van H. Manning, director of the Bureau of Mines, told of the following methods used in effecting conservation:

"I think it is quite important to point out just how a natural gas supply can be conserved and taken care of in such a way as to produce what might be termed a 'dependable' supply, so that the producer can be assured of a fair return on the investment, and the public itself can be assured of a supply at all times to meet its needs. A practical demonstration of this point has been given in operations in the Osage Nation in the Oklahoma fields. Here it has been the policy to grant leases covering large areas of land, and in giving these leases it should be particularly emphasized that the royalties and bonuses paid for such leases have been purely voluntary and have been made by the operators on their own initiative. Through competitive bidding they have learned that a dependable supply of gas can be obtained from such leases and the higher price obtained has not been in the nature of a profit but has been in the nature of establishing this dependable supply of gas by installing adequate equipment which ultimately insures a safe investment. The large areas of land allows the operator to drill wells without danger of being menaced by offset wells from a neighbor which would assist in ultimately tapping the available supply of gas. A fair price at the well has given the operator proper inducement to submit to such regulations and to install such equipment as would insure an adequate supply to the consumer.

Results of Methods Employed in Osage

"Because of the methods employed for carrying on operations in the Osage, fewer wells have been drilled and, therefore, less capital has been invested in drilling operations which could be invested in other equipment. In outside leases competition has necessarily forced the rapid drilling of wells, causing greater waste, and hence more money has been spent than was actually necessary. There has been a greater ultimate production per well in the Osage than any other gas field. The importance of a dependable supply of gas has become recognized by many operators so that they are perfectly willing to give more for gas in this field as has been demonstrated many times in prices offered for gas in the Osage and on commercial lands outside the Osage in the same field. The assurance of a fair return on the investment in the Osage has allowed the operators to go to other fields and buy gas which they would not otherwise be able to handle because they know that if the outside supply should fail they would still have the Osage gas to fall back on. Better equipment can be employed because a definite supply of gas being assured over a definite period of time, they know that the returns will be adequate and they would not in a year or so be incumbered with useless machinery which had not been used long enough to pay interest on the money invested."

A. G. A. Denies Opposing Daylight Saving

The American Gas Association has made public correspondence between the association and United States Senator Calder in which the association denied that it is engaged in any propaganda against daylight saving.

Senator Calder, replying to a letter from the association, declared that he had often heard it charged that gas and electric light interests were conducting propaganda in opposition to the daylight saving law, but that after a careful inquiry he had "found no facts to substantiate this charge."

"The effect of the daylight saving law upon gas companies," the association's statement said, "has been so negligible as to be unworthy of consideration, and in several large localities the difference in sale of gas, due to daylight saving, was so small that it could not be even definitely established."

Van Wert, Ohio, Company Rate Increased

A rate of $1.85 per 1,000 ft. for manufactured gas has been fixed by the Ohio State Public Utilities Commission for Van Wert, Ohio., consumers. It is based on a valuation of the property of the gas company and on estimates of increased operating expenses. The city council of Van Wert fixed the rate at $1.40, but the gas company appealed.

Higher Rates for Larger Consumers Ruled Unjust by Pennsylvania Commission

Higher rates for larger consumers is an unjust discrimination and illegal, is the decision of the Pennsylvania Public Service Commission on the sliding increased scale of rates proposed by the Pennsylvania Gas Company, a corporation supplying natural gas to the people of Erie and Corry. Complaint was filed by the two cities against the proposed schedule of the company, which sought to increase its rates with each 5,000 cu. ft. of increased consumption Oct. 31, 1919.

Commissioner Rilling, who wrote the decision, lays down the new policy that a public utility company may require careful use of its product for the elimination of waste. The decision suggests that in order to conserve its supply the gas company should carry on a campaign of education among its patrons as to the best methods of conserving gas. The commission orders that the company make a proper inspection of the extent to which its gas is consumed by its patrons.

Large Increase in Use of Industrial Gas in 1919

The Public Service Company of Northern Illinois reports that during the year just ended a large increase was made in the quantity of gas sold by the company for fuel purposes in manufacturing. A very considerable expansion of this business was made in 1918, but that total was greatly exceeded last year. The figures for the latter, large as they are, would no doubt have been greater except for the interruptions in general business made by the coal miners' strike.

Some of the company's heaviest gas customers were compelled to close their plants for lack of coal required in many of their departments.

The chief consumption of fuel gas is made by plants located in the industrial districts around Chicago, especially those sections lying south and west of the city. There are in these districts many plants of great size, some of them employing literally thousands of workers and representing altogether a diversification of manufacturing such as exists in few parts of the country. Fuel gas users include a large proportion of the biggest plants, but the list of customers contains also the names of many

others. Some plants running at their normal capacity require as much gas monthly as suffices for the entire needs of numerous towns ranking as important.

It is interesting to note that in the case of practically every plant connected to the company's mains the use of gas was begun on the slenderest possible scale. In one special instance a single gas jet installed in the laboratory of the establishment was followed by the adoption of gas in nearly all departments within a year. The efficiency of the fuel demonstrates itself speedily.

The Lumen has from time to time published stories describing the employment of gas heat treatment processes in these plants. There are very many such uses. One plant finds gas the ideal fuel required in thirty distinct processes. A remarkable feature of the fuel's versatile powers of adaptation to requirements is that the experience of a few hours is sufficient to indicate its superiority. It has been said give gas a chance and it will establish its own case in short order.

One of the latest employments for the fuel is in enameling. In this operation an oven of the muffle type is required. With ordinary fuels, heat generated by the fire at the bottom of the oven is circulated in the blank space between the outer skin and the oven proper, the fumes being permitted to escape through a flue at the top. Gas, being free from the dirt caused by other fuels, renders a marked change in practice possible. The heat developed by gas is circulated on the sides of the muffle, but instead of being allowed to escape through a flue it is directed at the ceiling of the oven in such a manner that heat is radiated back on the articles being enameled. The effect is a great increase in efficiency. The physical changes in the oven enable also a large saving to be made in floor space.

In the industrial districts around Chicago several dozen enameling ovens are in active operation. Such is the success made by gas in those ovens where it has been installed that it is not doubted the remainder of the number will be arranged for that fuel. Enameling constitutes a desirable gas load. The demand is continuous Sundays and week-days and the consumption is large.

St. Louis Company Returns to Pre-War Heat Unit Standard

C. L. Holman, president of the Laclede Gas Light Company, St. Louis, notified city officials that he had instructed his operating department to maintain the quality of gas on the pre-war basis of 600 B.t.u. per 1,000 cu. ft.

During the war the company was permitted to reduce the quality to a maximum of 575 and a minimum of 520. This permission was granted to permit the gas company to make toluol, used in making explosives for the Government, the extraction of toluol depriving the gas of some of its heat units.

Gas Company Claims Violation of Constitutional Guarantees to Private Property

Violation of the constitutional guarantees to private property is alleged by Charles W. McGuire, owner of the Holland (Mich.) Gas Company, in a complaint filed in court asking that the order of the Michigan Public Utilities Commission fixing the net gas rate for that city at $1.45 per 1,000 cu. ft. be declared "unlawful and unreasonable," and set aside.

Mr. McGuire states that the utilities commission placed a valuation of $180,000 on his property, when, he says, it should have been $300,000. On the basis of its valuation the commission allowed a 7 per cent return. The complaint claims that a return of 9 per cent and net rate of $1.70 will be necessary to keep the property intact and in operation.

In this suit, the first one filed in court asking for relief from an order of the new Michigan Public Utilities Commission, it is charged that the commission's order will result in taking private property for public use without just compensation in violation of Section 1, Article 13, of the Michigan Constitution and the fifth amendment to the Constitution of the United States. Also, that it will operate to take private property without due process of law, which is contrary to Section 16, Article 2, of the State constitution and amendment 14 to the Federal constitution.

The valuation established by the utilities commission of the Holland company's property was made in view of the early history of the utility, the commission maintaining that much "watered" stock and speculative methods had been used to the possible profit of a few investors. C. W. McGuire purchased the company for a nominal cash sum after it had been in bankruptcy in Federal court, assuming about $300,000 in outstanding bonds as the part of the purchase price.

Two New Gas Wells Brought In in Oklahoma

Reports of two new gas wells in Oklahoma near the pipe lines of the Lone Star Gas Company supplying Dallas and other North Texas cities has been received. One of them, in the Fox field, will put in excess of 2,800,000 cu. ft. a day into the Fox field-Dallas pipe line.

In the Fox field the Gypsy Oil Company brought in its Lindersmith No. 6 with an open flow capacity of 11,250,000 cu. ft. a day and a high rock pressure. The finding of the big gas jet at 1,800 ft., however, caused the Gypsy interests to sell the production to the Lone Star, and the well is to be connected to the pipe line to Dallas, Tex. Under the Oklahoma laws only one-fourth of the open flow may be turned into the pipe line, so the well will add approximately 2,800,000 cu. ft. a day to the supply, as long as the open flow holds up. However, most of the Fox field gas wells drop off after a few weeks, both open flow and rock pressure falling more or less rapidly.

The Plains Oil & Gas Company's Bondurant No. 4 well, in the Keys or Walters field of Oklahoma, came in with an open flow of 3,200,000 cu. ft., but the drillers were still working on the well in the hope of increasing the flow somewhat. When drilling of the well is finished the allowed 25 per cent of its open flow capacity will be turned into the Keys-Petrolia-Fort Worth-Dallas pipe line.

Gas Well Struck in Hancock County, Ky.

Gas has been struck by the John Campbell Company in the F. J. Alsop place, near Hawerville, Ky., in Hancock County, at a depth of 600 ft. When the well was shot, fire shot six feet above the ground. Later an accidental fire burned the hand and hair from the back of the head of one Harry Farnes, a machinist in charge of the outfit. The report states that the ground around the well has been trembling for several days.

N. Y. Consolidated Annual Report Shows Earnings Decreased in 1919

George B. Cortelyou Makes Statement Telling of 1919 Great Increase of Appliances Installed

The annual report of the Consolidated Gas Company of New York for the year ended Dec. 31, 1919, shows a net income, after provision for interest charges and taxes, of $4,112,440. This compares with a net of $5,702,400 in the preceding year. After the payment of dividends there was a deficit of $2,909,356, comparable with a deficit of $1,292,393 in 1918. In his statement to stockholders George B. Cortelyou says that while it was predicted in the last annual report that profits would be impaired in 1919 because of high costs of labor and materials, the results were worse than anticipated.

This is attributed to the fact that the higher cost of materials and of labor affected only a part of 1918, whereas there was a progressive forward movement all last year, materials in particular touching higher prices than at any time in the war period. As a result it is asserted that the cost of manufacturing and distributing gas is substantially higher than at any time since war was declared in Europe, and it is held that there is no prospect of betterment.

"The total increase," said Mr. Cortelyou, "in the combined operating expenses for 1918 over 1917, and for 1917 over 1916, as stated in the last annual report, amounted to $6,840,970 and $9,366,003 respectively. The total increase in the operating expenses for 1919 over 1916 amounted therefore to $22,411,382, about 70 per cent of which may be attributed to increased expenses and taxes due to the war, the remainder being attributable to the greater quantity of gas and electricity sold.

"The increase in the cost of gas oil will, it is estimated, add during the year 1920 $565,000 to the gas manufacturing costs.

"The gas sent out by the Consolidated and its allied gas companies during the year 1919 exceeded the quantity sent out during the year 1918 by 2.69 per cent. During 1919 the Consolidated and its allied gas companies installed 211,085 appliances; 62,395 were surrendered to the companies, leaving a net increase of 148,890, against the net of 107,414 in the previous year. The net increase in 1919 included 4,065 hotel and restaurant appliances, 3,414 industrial appliances, 4,133 gas-fired steam radiators and 25,012 miscellaneous appliances.

"The gas sales in Manhattan, the Bronx and Queens, and in Westchester County amount to 686,594,100 cu. ft. more in 1919 than in 1918, a gain of 2.08 per cent, compared with a gain of 7.18 per cent in 1918 over the previous year."

Construction Notes

60,000 Cu. Ft. Holder Erected for Prescott Gas Co.

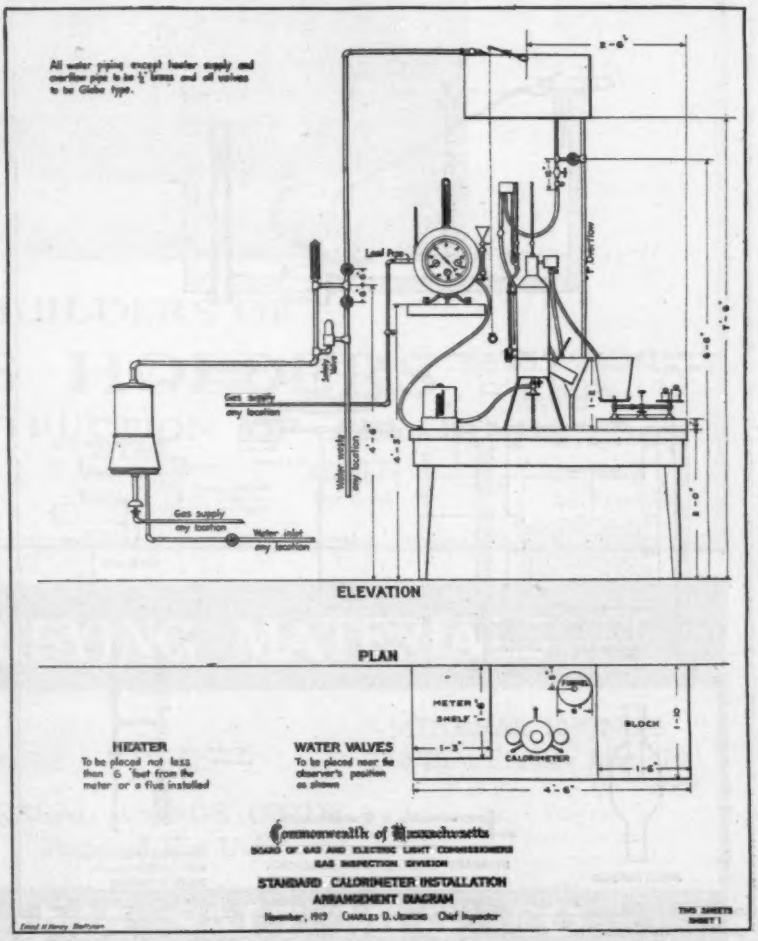
The new 60,000 cu. ft. gas holder for the Prescott (Ariz.) Gas & Electric Company has been completed. A large tank is now being erected. These improvements are for the purpose of insuring gas storage for a full supply of gas for the city of Prescott for twenty-four hours.

Massachusetts Department of Public Utilities Installs Calorimeter

The Department of Public Utilities in Boston, Mass., has recently installed a calorimeter. The calorimeter installed, in the illustration below, is the standard form which has been adopted by the Gas Inspection Division of Massachusetts, which division is under the direction of Charles D. Jenkins.

Federal Gas Company of Colorado Installs Machinery for Manufactured Gas

The Federal Gas Company of Boulder, Col., has awarded a contract to the Gas Machinery Company of


All water piping except heater supply and overflow pipe to be ¾" brass and all valves to be Globe type.
ELEVATION
PLAN
HEATER
To be placed not less than 6 feet from the meter or a flue installed
WATER VALVES
To be placed near the observer's position as shown
CALORIMETER
BLOCK
Commonwealth of Massachusetts
BOARD OF GAS AND ELECTRIC LIGHT COMMISSIONERS
GAS INSPECTION DIVISION
STANDARD CALORIMETER INSTALLATION
ARRANGEMENT DIAGRAM
November, 1919 CHARLES D. JENKINS Chief Inspector
TWO SHEETS SHEET 1

PART I OF ILLUSTRATION SHOWING STANDARD FORM OF CALORIMETER ADOPTED BY MASSACHUSETTS DIVISION OF PUBLIC UTILITIES

Cleveland, Ohio, for a six-foot water gas apparatus and auxiliary equipment to be installed at once.

The natural gas which was formerly available is not entirely gone and H. B. McClure, general manager of the Federal Gas Company, is preparing to take care of the large increase in send-out which the growing city of Boulder demands with manufactured gas.

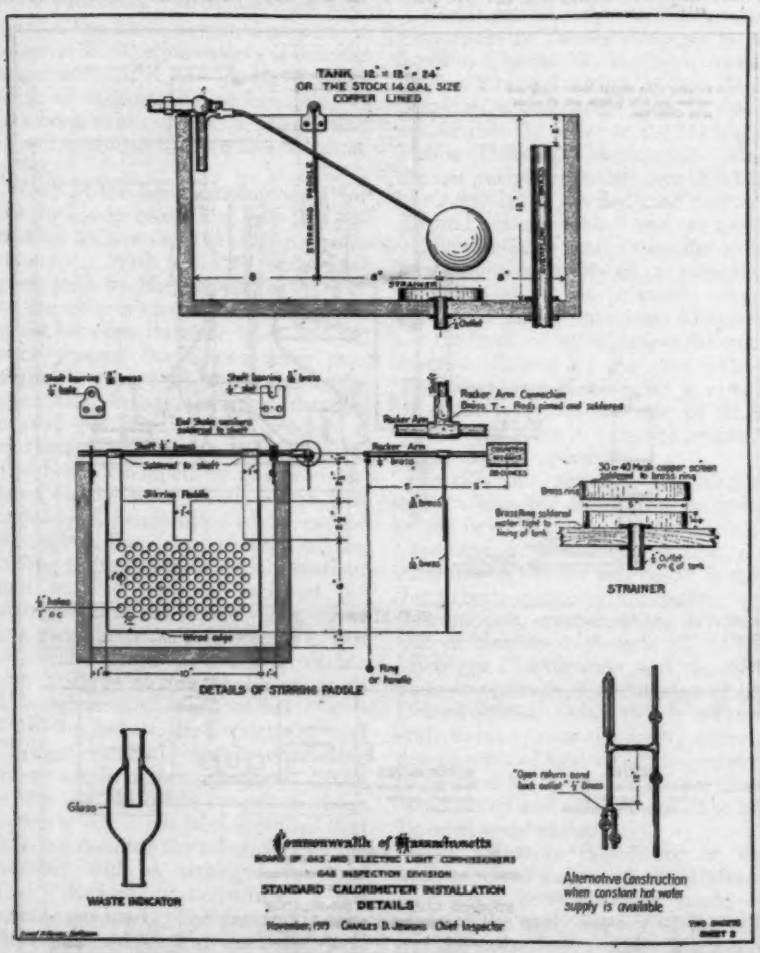
Contract Combining Natural with Manufactured Gas in Process

Initial preparations for the proposed contract between the city of Louisville, Ky., and the Louisville Gas & Electric Company, by which the latter will augment the natural gas supply by manufacturing gas, are under way. Halford Erickson, vice-president and efficiency expert for the company, now is in Chicago conferring with the Byllesby Company with regard to the terms of the contract, and Inspector of Gas and Electricity Harry M. Limbach left for eastern Kentucky to inspect the ten-mile pipe line reported completed by the company.

According to the terms of this contract with the city, a mark of 1,150 B.t.u. for the natural gas and 575 for the manufactured gas must be maintained, and the daily test while the mixture is being supplied must show a minimum of 12,000,000 cu. ft. of natural gas and a maximum proportion of 3,500,000 cu. ft. of manufactured gas to this.

Fire at New Bedford Gas Co.

A fire which started supposedly from spontaneous combustion, damaged the engine room of the gas works of the New Bedford (Mass.) Gas & Edison Light Company. Nearly all the machinery in the room was partially disabled and damage which will run into several thousand dollars was sustained by three blowers, four exhausters, five pumps, two engines and two compressors. The gas supply was cut off for twelve hours.



PART II OF ILLUSTRATION OF CALORIMETER INSTALLED BY MASSACHUSETTS DIVISION OF PUBLIC UTILITIES

Northeastern Ohio Gas Company Plans to Discontinue Its Service Sept. 1

Natural gas service will be discontinued in the city of Akron, Ohio, on Sept. 1, 1920. This information has just been received by F. W. Stone, manager of the Ashtabula Gas Company, from M. B. Daly, president of the Northeastern Ohio Oil & Gas Company. The cities of Conneaut, Geneva and Jefferson, Ohio, will also be affected by this order, for Mr. Daly says in his letter: "We will make application very soon to the Ohio State commission for the privilege of discontinuing the service to practically all the patrons of the Northeastern at a date not later than Sept. 1, 1920."

Personal Notes

Frank L. Cross Elected Manager Detroit Gas Company

Frank L. Cross, until recently vice-president and general manager of the St. Paul (Minn.) Gas Light Company, was elected general manager of the Detroit (Mich.) City Gas Company at its annual meeting Jan. 20 and is now on duty at the Detroit office.

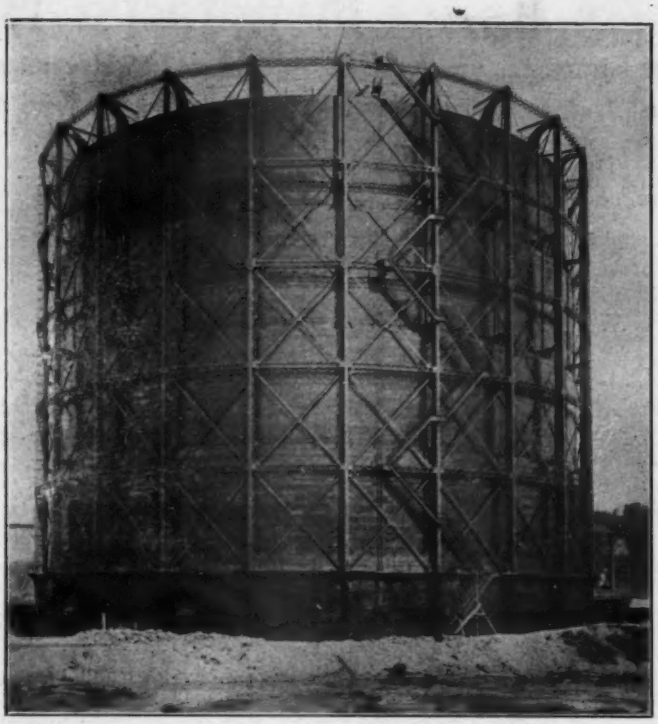
Mr. Cross was formerly connected with the Detroit gas company before he took a position with the St. Paul company about ten years ago. His return to Detroit is occasioned by the large growth of the gas business in Detroit, which made it necessary to divide the duties of Charles W. Bennett, who, as vice-president and general manager, has been the active head of the company and has attended to the duties of both offices.

Mr. Cross will relieve Mr. Bennett of much of the detail work connected with the operation of the company. Mr. Bennett will devote the greater part of his time to general executive and financial work and to the development of constructive policies.

RITER-CONLEY CO.

PITTSBURGH, PA.

PURIFYING BOXES



STEEL TANKS

BUILDERS OF

TWENTY YEARS EXPERIENCE **GAS HOLDERS** HAS TAUGHT US HOW

STEEL CONSTRUCTION OF ALL KINDS

Philadelphia Pottstown Detroit Chicago Cincinnati
Washington New York Boston Syracuse San Francisco

GAS PURIFYING MATERIALS

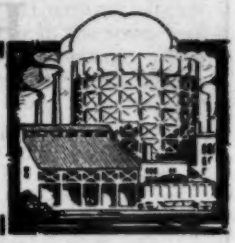
NATRONA RED ORE
To Be Mixed With Fluffing Material

MINERAL SPONGE
The Best Fluffing Material

MINERAL SPONGE OXIDE
Prepared For Use

PENNSYLVANIA SALT MFG. CO.
WIDENER BUILDING
PHILADELPHIA - - - - - - - PENNA.

With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

A Continuous System of Tar Distillation

In a recent catalogue issued by Blair, Campbell & McLean, Inc., Philadelphia, Pa., they announce that they are the sole manufacturers for the United States, Canada, Mexico and South America of Hird's Continuous System of Tar Distillation.

This type of plant consists of three or more stills, made of cast iron, through which the tar is passed in series.

Stills Nos. 1 and 2 each contain a number of steel tubes, 6 in. in diameter and ¼ in. thick, expanded into ½-in. steel end plates, which are bolted to the flanges of the cast-iron casing. These tubes form the only medium by which the heat is transmitted to the tar, which is made to flow along the outside surface of the tubes by means of baffle plates.

The tubes may be heated direct by means of burners, if a supply of coal gas or producer gas is available, or by a coke breeze furnace.

The last still of the series is usually heated by the hot waste gases from Nos. 1 and 2, which are passed through a flue beneath it, and thence to the chimney. A small quantity of steam is blown through this still by means of perforated pipes.

One pitch cooler of cast iron, the same size as a still, which also acts as a heat interchanger, being fitted with tubes, through which the crude tar is passed. The finished pitch overflows from the cooler without fumes and is run direct to the pitch beds.

The products of distillation leaving the three stills are passed through cast-iron coils in the heaters, which consist of cast-iron casings, and through which the crude tar is passed successively before going to the pitch cooler.

The heat from the vapors in the coils drives off the ammoniacal liquor and naphtha, which are collected from the tops of the heaters and passed through a separate condensing coil.

The vapors from the stills are finally condensed in the condensers, from which the oil passes through sight overflow boxes to the receiving tanks.

The plant produces simultaneously, besides the ammoniacal liquor, four fractions of distillates, the character of which may be varied at will by the alteration of the temperatures of the stills, each still having its own heater, condenser and sight overflow.

The following fractions are produced:

Ammoniacal liquor.
Naphtha from the heaters.
Light oil from No. 1 still.
Creosote oil from No. 2 still.
Anthracene oil from No. 3 still.

Method of Operating Plant

The crude tar passes first into the regulating tank, which is provided with a float valve in order to maintain a constant feed to the stills. On leaving the regulating tank the tar passes through a series of heaters and then into the stills.

The products distilled from the tar pass over through a swan-neck outlet, and are then led through the heaters by means of cast-iron coils.

The cold tar passing through the heater is heated, and at the same time the vapors from the stills are condensed. The crude tar is heated to such a degree that ammoniacal liquor and naphtha are distilled off from the heaters, and these products are separately condensed and collected.

This preliminary distillation entirely does away with the necessity for the dehydrating apparatus which is necessary previous to distillation in the ordinary intermittent tar still.

Leaving the heaters, the heated tar passes through the pitch cooler, where a further interchange of heat takes place, the ingoing tar being still further heated to about 250 deg. Fahr. and the outgoing pitch is correspondingly cooled.

From the pitch cooler the hot tar passes into the stills. The course of the tar through the stills is directed by internal baffle plates, and is of a circuitous character. The depth of the tar in the stills does not exceed 15 in. In No. 1, at a temperature of 500 deg. Fahr., the light oils are removed from the tar; in No. 2 still, at 600 deg. Fahr. the creosote oil is driven off, and in the last still at 550 deg. Fahr. the anthracene oil comes over.

The first two or three stills are only heated by gas or coke furnaces; the last still of the series, in addition to heating tubes (only required in starting the plant), is fitted internally with perforated steam pipes and the steam is used to drive off the anthracene vapors, which it does very effectively.

The volatile products having thus been driven off, nothing is discharged from the last still but pitch. Before entering the pitch bays, the pitch flows through a special horizontal cooler, and from here it is continuously discharged, with a total absence of disagreeable fumes.

It is possible so to adjust the temperatures as to obtain continuously uniform products of any desired boiling point, while at the same time the pitch can be varied to obtain any desired twisting point.

One man is able to superintend entirely the working of the plant, the stills being fitted with recording thermometers, which indicate clearly the working of the stills and are a permanent record.

The distillates are collected separately in receivers of about 5,000 gal. capacity, and during a complete run show practically no variation.